

**SHIP PRODUCTION COMMITTEE
FACILITIES AND ENVIRONMENTAL EFFECTS
SURFACE PREPARATION AND COATINGS
DESIGN/PRODUCTION INTEGRATION
HUMAN RESOURCE INNOVATION
MARINE INDUSTRY STANDARDS
WELDING
INDUSTRIAL ENGINEERING
EDUCATION AND TRAINING**

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Overview of Panel SP-6 - Marine Industry Standards

**U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER**

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PANEL SP-6

MARINE INDUSTRY STANDARDS

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ABSTRACT

SNAME Panel SP-6 on Marine Industry Standards is one of ten technical panels operating under the SNAME Ship Production Committee. Priority shipbuilding research, and development standardization projects are funded jointly by the Maritime Administration, the U.S. Navy, and the maritime industry. Projects which focus upon the publication and implementation of national standards are coordinated closely with Committee F-25 on Shipbuilding of the American Society for Testing and Materials. The results of these standardization projects have marine industry-wide applications that result in direct cost and time saving benefits in the construction and repair of Naval and commercial vessels.

Panel SP-6, in conjunction with ASTM Committee F-25, together form the National Shipbuilding Standards Program and provide a mechanism to support the Navy's 600-ship fleet. The U.S. Navy continues to increase its direct participation in this program, which has the potential to improve productivity in new construction and life-cycle maintenance by substituting commercial standards for the often more costly Military Standards presently cited.

MARINE INDUSTRY STANDARDS

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INTRODUCTION

The idea of standardization is not new to the shipbuilding industry; however, the creation by industry and implementation by government agencies of marine industry consensus standards is a relatively new one. Over the past nine years, SNAME Panel SP-6 has provided the voluntary efforts of ASTM Committee F-25 on Shipbuilding Standards with over 100 draft standards through a cooperative effort known as the National Shipbuilding Standards Program. This cooperative effort is increasing awareness of the significance of shipbuilding standards that satisfy the needs of Naval and commercial construction. The U.S. Navy and U.S. Coast Guard have been major contributors to the National Shipbuilding Standards Program since its inception, and with this continued support, the Program can continue to develop quality commercial standards for virtually all types of ship building and repair. Standardization has always been supported by upper management, as evidence by the following statement in a recent issue of American Metals Market by Mr. Eddy G. Nicholson, Chairman, Bath Iron Works Corporation,

"Increased standardization of components and whole ships is essential for developing economies of scale and mass production, and can be achieved without degrading mission capability. Both the Navy and the shipbuilders must eschew the traditional "one of a kind" mentality. Development of weapons and electronic systems should focus on making these systems compatible with a variety of ships. In addition, shipyards with Navy concurrence must go much further toward standardizing basic mechanical and structural components which will reduce elapsed construction time and procurements costs for new ships and their spare parts." ¹

THE REASONS FOR STANDARDIZATION

Although everyone is generally in favor of standardization, the reasons for standards need to be clearly understood before this program can reach its effective goal.

Standardization plays an important part in industrial productivity. The degree to which standards are applied to form, fit, or function depends largely upon the specifics of the industry, the elements of the product being produced, and the processes being employed. In recent years, for example., where advanced techniques have been utilized in shipbuilding for modular unit construction, interfaced material and production control, and zone-oriented production, standardization has been one of the key elements in the success achieved. Standardization can be applied to virtually all equipment, material, design, procurement areas, and even the production processes. It can range from standard threads for nuts and bolts to building multiple copies of complete ships with different missions but with the same hull and machinery, altering only those features unique to the mission. Standardization is

usually thought of in terms of mass production. Shipbuilding per se, however, is not a mass-production industry because of the small number of units. Therefore, standardization in shipbuilding usually applies to something less than a whole ship. Overhauls, particularly for submarines, performed late in the ship's service life are adversely affected by the unavailability of parts for critical components. The situation is made more difficult because ships of the same class from different builders have had different suppliers, and therefore different equipment, for similar functions. During the life of a ship, substantial economies can be realized from reduced procurement costs, engineering requirements, and simplification of overhauls, provided attention is given to standardization during design and construction. Logically, the use of appropriate standards will contribute to productivity by assuring required product quality, reducing procurement and production time, and minimizing cost. Standards, if adhered to and maintained, can assure increased service performance, decreased failure, and reduced ship maintenance. Standards assure ease of fabrication, fit, 'quality, and inspection.²

Quality involves making something right the first time and involves a tough commitment from the workers to top management to make it work. Building quality into standards and the subsequent products does not come without cost. But one must consider that as quality rises, so does productivity. Consider the impact on productivity if every employee and every machine performed properly

the first time, every time. Employees could then handle more work, inspection could be reduced and those efforts directed towards production, and rework would be eliminated.³

Through the extensive use of shipbuilding standards, U.S. shipyards have the potential to sharply reduce construction costs and times through reduction of poor communications and misunderstandings. While reducing cost is the major benefit of standards implementation, other advantages also exist. The customer and builder will be better able to define, agree upon, and meet safety requirements. Standardization also leads to the development of specialized manufacturing of standard components and enables the purchase of these components in larger quantities, with shorter lead times, and at a lower cost. Standards also enable the shipbuilders and manufacturers to level-load their work by assigning the workforce to manufacture and/or construct components during the slack time of a construction program. This can help avoid the layoff-overtime pendulum which often drives qualified workers from this industry.

OVERVIEW OF SNAME PANEL SP-6 ON MARINE INDUSTRY STANDARDS

Since its reactivation in 1977, SNAME Panel SP-6, through MarAd/Navy/Industry cost-shared programs, has performed an essential support function by accomplishing a "pump-priming" effort by providing an initial boost to the voluntary efforts of ASTM Committee F-25 in the form of draft standards. These draft standards are put through the rigorous ASTM voluntary consensus system and eventually published as national shipbuilding standards.

Because of the urgent need for these draft standards to be published, Panel SP-6 has redirected its major effort from a producer of draft standards to assisting in all efforts that lead to publication through the funding of this formerly voluntary effort. Although the panel has redirected its major effort, it will still support the development of high priority shipbuilding draft standards. Recent SP-6 projects and the draft standards produced under them are listed in Table I.

NAVY STANDARDS

By the Navy's own admission, at least 35% of the existing 4,000 MIL-SPECS and 3,500 standard drawings are either out of date or need extensive revisions. This situation is a cause for major concern in light of the current Naval construction program. The Standards and Specifications group within the Naval Sea Systems Command has been participating for two years in a pilot effort to convert Navy Documents into technically up-to-date and less costly commercial equivalents. This work is directed by a subcommittee under the ASTM Committee *F-25* on Shipbuilding. Certain valuable specifications once used by the Maritime Administration have also been introduced into the system. This voluntary program has recently been expanded through funding from SNAME Panel SP-6.

Panel SP-6 has approved a method that will provide direct funding to support the technical review and analysis of selected high priority Navy documents, and this funded program will concentrate on Navy documents which will have the greatest impact within the existing Navy shipbuilding programs when issued as commercial standards. Funding of these selected high priority Navy documents will proceed in parallel with existing ongoing voluntary efforts.

The major benefit of this program will be the cost savings which result from having a base of U.S. shipbuilding standards that will be adopted and cited by the U.S. Navy for use in new construction, repair, or overhaul. This will then reduce the number of military specifications cited in construction of Naval vessels, and allow U.S. shipbuilders the opportunity to use these lower cost commercial standards. The adoption of industry-wide standards will also decrease the effort in the detailed proposal phase of the shipyard/ship owner (Navy) negotiations and yet still have design flexibility that would allow the customer and builder to be able to more easily define the cost elements associated with any unique qualities in the design. The adoption of these standards can only be done by the full participation of government agencies in voluntary consensus standards activities.'

ADOPTION OF INDUSTRY STANDARDS BY THE U.S. GOVERNMENT

For about 25 years, the Department of Defense's (DoD) policy has been to adopt and use nongovernment standards where they meet needs, rather than duplicate work that has already been done. In 1976, the Office of Management and Budget (OMB), acting on the recommendation of the Interagency Committee on Standards Policy, began work to issue a government-wide policy similar to the DoD's. That policy was issued in 1982, and provided renewed emphasis for this program, whereby DoD participates in the development work of nongovernment standards groups and adopts their standards where possible.

Government participation in standards development is generally for the purpose of ensuring that its requirements are given consideration in drafting the standard. For representation to be effective, the government must begin in the early drafting stages of the nongovernment standard and be consistent throughout development. When appropriate, and if the ASTM committee agrees, Navy, Coast Guard, and other government groups' needs can be accommodated in the document by inclusion, reference, or other suitable means. Government participants must not attempt to "militarize"^{t1} nongovernment documents through inclusion of unique requirements best left to military documentation. Often government's needs apply to other users as well and inclusion of a "when specified" paragraph which can accommodate those users without adversely affecting other use of the document. This makes the standard more easily adoptable by the Navy and many others who use the documents for procurement.

It is DoD policy that, where a nongovernment standard exists, or can be prepared in time to meet the DoD's needs, it will be adopted in lieu of preparing or maintaining an equivalent military specification or standard. Adoption is the process by which DoD examines a nongovernment document and formally accepts the document. The adopted document is then listed in the DoD Index of Specifications and Standards (DODISS), and is the only version of the standard authorized for use by DOD. Any further revision to the document must be reviewed and adopted on its own merits. Documents which fully satisfy the needs of, the Navy and other government groups with respect to technical sufficiency and economy are generally adopted.

Some problems exist within the present system, as was recently pointed out by DoD official Gregory Saunders.

"Government specification writers have a somewhat natural bias toward their own documents. They know intimately the system under which they are prepared and the procedures for making changes. Although the military specification system is a near consensus operation, the preparing activity (that group or agency that initiates a standards action) has a certain degree of latitude in considering and overruling comments and can get a document issued very quickly when necessary. Some preparers resent replacement of documents, on which they have spent a great deal of effort, with nongovernment documents, which they sometimes feel represent lowest common denominator standards. And even where document preparers do want to participate, adopt, and use nongovernment documents, they encounter difficulties getting commitment from upper management for travel necessary for consistent participation.

The mere existence of a policy to utilize nongovernment standards does not guarantee compliance within DoD any more than it does in any other organization. It takes time to overcome the prejudices against nongovernment standards, but progress is being made. Many DoD document preparing activities make extensive use of nongovernment standards and are showing that the myth of lowest common denominator is largely just that: a myth. It is being demonstrated on a daily basis that the benefits of participating, adopting, and using nongovernment standards far outweigh the disadvantages. This is an educational problem within DoD that can be resolved most readily through continued positive examples."⁴

RESULTS OF ASTM COMMITTEE F-25 ON SHIPBUILDING STANDARDS

All of the previously mentioned organizations are significant in the standardization process, but the most critical role is played by ASTM and its consensus process.

Draft standards resulting from SNAME Panel SP-6 projects are submitted to ASTM Committee F-25 for processing through this consensus system. ASTM's nationally recognized consensus standards have a built-in mechanism for periodic maintenance via a mandatory five-year minimum review cycle. This is an important element in keeping each standard current with existing technology.

The economic benefits of standardization are known to all of us; however, it is the entire industry's responsibility to produce the needed standards. No single organization can accomplish a task of this magnitude alone. The cooperative government/industry program underway within SNAME SP-6/ASTM F-25 provides a suitable mechanism to accomplish the task. What remains to be achieved is to secure the industry's full commitment to do the job.

The efforts of ASTM members are voluntary, and place the burden of standards development upon individual industries. The steel and automotive industries, for example, have developed their standards activities over many years. In these industries, active participation in organizations like ASTM is considered essential business practice, without which business activity would most certainly be chaotic.

ASTM Committee F-25 presently consists of technical subcommittees, each one concentrates on an individual area of shipbuilding standards development;

To date, over 30 standards have been published and several more standards are undergoing the final stages of the ASTM consensus process previous to publication. Presently there are over 125 active standards projects in various stages of development, and with SP-6 funding, many standards previously delayed in the industry consensus process will soon be published. See Table II for a listing of published F-25 standards.

The U.S. Navy has adopted many of the standards published by ASTM, and is presently reviewing others for suitability in Naval ship construction. As these ASTM standards are cited in Naval construction contracts and also the U.S. Coast Guard Regulations, the economic effects will be fully realized.

The full recognition of the importance of shipbuilding standards is most easily seen when potential dollar savings through the extensive use of these standards is stressed, and all future SP-6 projects will focus strictly on standards that will result in significant cost savings when cited in Naval construction contracts.

As of yet, the U.S. Shipbuilding Industry has not established an across-the-board commitment to standardization in spite of the fact that the term dardlt is being used on an increasing basis by experts of all kinds. Until our industry makes standardization a part of our daily routine, the maximum potential of the ASTM F-25 standardization program cannot be realized.

CONCLUSION

The use of current industry standards represents one of the most significant opportunities for improving productivity and cost reduction in the shipbuilding industry. Standards are also a necessary requirement for the development of automation in the industry.

Increasing the use of commercial shipbuilding standards on both Naval and commercial ships is a primary goal of the National Shipbuilding Standards Program. Again, the ultimate success of the program rests with the industry's ability to provide the resources necessary to support the efforts of both SNAME Panel SP-6 and ASTM Committee F-25. Your active participation assures that this program can continue to develop into the industry focal point for sound industry shipbuilding standards that can be used in both Naval and commercial construction.

REFERENCES

1. Eddy G. Nicholson, "Rebuilding of U.S. Fleet is Vital National Goal," American Metal Market, April 30, 1984.
2. National Research Council Committee on Navy Shipbuilding Technology Marine Board "Productivity Improvements in U.S. Navy Shipbuilding," National Academy Press, June, 1982.
3. Kathleen Riley, "Quality Requires Commitment," Standardization News, July, 1985.
4. Gregory E. Saunders, "Gimme A Spec," Standardization News, May, 1985.

TABLE I-

RECENT DRAFT STANDARDS' & REPORTS

SPONSORED UNDER PANEL SP-6

Task S-25 on HVAC Construction Standards:

- Standard Specification for Goosenecks
- Standard Specification for Terminals
- Standard Specification for Fire Dampers
- Standard Specification for Control Dampers
- Standard Specification for Duct Hangers
- Standard Specification for W.T./N.W.T. Closures
- Standard Specification for Penetrations
- Standard Practice for HVAC Drafting
- Standard Practice for Volumetric Testing of HVAC Air Systems
- **Duct Details**

Task S-27A, Outfit Construction Standards:

- Standard Practice for Machinery Space Supports for Machinery Space Floors, for Marine Use
- Standard Practice for Machinery Space Floors for Marine Use
- Standard Specification for Handrails, Open (Storm and Guard)
- Standard Specification for Staples, Handgrabs, Handle, and Stirrup Rungs
- Standard Specification for Semi-Flush O.T./W.T. Bolted Manhole
- Standard Specification for Semi-Flush O.T./W.T. Hinged, Bolted Manhole
- Standard Specification for Raised O.T./W.T. Bolted Manhole
- Standard Specification for Machinery Space Handrails and Stanchions
- Standard Specification for Flush O.T./W.T. Bolted Manhole

Task S-28, Update of MarAd Schedule for Pipes, Joints, Valves, Fittings, and Symbols:

- Standard Material Schedule for Shipboard Pipes, Joints, Valves & Fittings for Commercial Ship,&

Task S-30, Mechanical Construction Standards:

- Standard Practice for Design and Application of Valve Label Plates
- Standard Practice for Arrangement of Piping System Thermometer Connections
- Standard Specification for Expanded Sockets for Pipe & Tubing
- Standard Practice for Design of Overboard Discharge Connections
- Standard Practice for Design of Lifting Padeyes
- Standard Specification for Bilge Strainer Boxes
- Standard Practice for the Selection & Application of Valve Operating Gear

Task S-31, QA/QC Acceptance Standards:

- Study produced list of QA/QC acceptance standards in use and made recommendations to produce priority standards.

Task S-32, Purchase Specification Bid Response Sheets for:

- Tubular Heat Exchangers
- Plate Type Heat Exchangers
- Centrifugal and Rotary Pumps for Liquid Service
- Axial Flow Fans
- Centrifugal Fans
- Control Valves
- Remote Valve Operators
- Packaged Refer Units
- Refer Compressors - Reciprocating
- Refer Compressors - Rotary
- Refrigeration Condensers, Receivers, Accumulators
- Refrigeration Oil Traps & Separators
- Refrigeration Expansion Valves, Gages, Thermometers
- Ship Service Generators
- Emergency Generators

Task S-33, Mechanical Construction Standards IV

- Standard Specification for Fire & Foam Cabinets
- Standard Practice for Selection of Thermometers
- Standard Practice for Selection of Gages for Vacuum, Pressure, and Compound Services
- Standard Practice for Shotblast Descaling of Interior Surfaces of Steel Pipe
- Standard Specification for Rigid and Non-Rigid Reach Rods
- Standard Specification for Large Plate Flanges, 14" O.D. and above
- Standard Specification for Tank Sounding Striker Plates
- Standard Practice for Forming Flanged Pipe/Tube Ends for Lap Joint Flanges (Van Stone)

Task S-34, Feasibility Study for the Commercialization of U.S. Navy GENSPECS:

- Study produced final report for the feasibility of U.S. Navy GENSPECS, identifying Navy Standards that could be substituted with existing commercial standards.

Task S-35: Hull Design & Construction Standards:

- Standard Specification for Three Compartment Dispensing Tank
- Standard Specification for 65 Gallon Dispensing Tank
- Standard Specification for Portable Davits
- **Standard Specification for Ships Letters and Numerals**
- Standard Specification for Cargo Tank Ladders
- Standard Specification for Cargo Tank Rails
- Standard Specification for Cargo Tank Platforms
- **Standard Specification for Pyrotechnic Storage Box**

Task S-36, Functional Design Configuration Standards:

- Functional Configuration Standards showing typical equipment packages for:
 - Multi-Stage Distiller
 - Geared Steam Turbine Lube Oil Unit
 - Fuel Oil Service Unit
 - Service Air Unit

Task S-37, Watertight/Gastight and Non-Weathertight Door Standards:

- Standard Specification for Watertight Door
- Standard Specification for Airtight/Gastight Door
- Standard Specification for Non-Weathertight Door
- Standard Specification for Gastight Double Door
- Standard Specification for Dutch Door

Task S-39, **Functional Design Standards:**

- Expanded Metal Bulkheads
- Expanded Metal Doors
- Jack Staff
- Ensign Staff
- Portable Guard Rails
- Emergency Gear Stowage Locker
- Deck Gear Stowage
- Panama Canal Shelter
- Valve Locking Devices
- Chemical Feed Tanks
- Docking Plugs
- Dog Bolts

Task S-dOA, Standard Bid Response Sheets - Phase II:

- Propulsion Lineshaft Bearings, Lined Pillow-Block Type
- Propulsion Lineshaft Bearings, Rolling-Element Type
- Stern Tube Bearings, Water Lubricated, Stave-Type, Rubber
- Stern Tube Bearings, Water Lubricated, Stave-Type, Other than Rubber
- Stern Tube Bearings, Water Lubricated, Solid-Type, Rubber
- Propulsion Shafting Bulkhead Stuffing Boxes
- Stern Tube Stuffing Boxes
- Fuel Oil Heaters, Diesel/JP=5/Other "Light" Fuels
- Fuel Oil Coolers, Diesel/JP-S/Other "Light" Fuels
- Fuel Oil Meters, Diesel/JP-S/Other "Light" Fuels
- Fuel Oil Centrifuges/Purifiers, Diesel/JP=5/Other "Light" Fuels
- Fuel Oil Filters, Diesel/JP-S/Other "Light" Fuels

- Fuel Oil Suction Strainers, Diesel/JP-S/Other "Light" Fuels
- Fuel Oil Discharge Strainers, Diesel/JP-5/Other "Light" Fuels
- Fuel Oil Heaters, Heavy-Oil Fuels
- Fuel Oil Meters, Heavy-Oil Fuels
- Fuel Oil Suction Strainers, Heavy-Oil Fuels
- Fuel Oil Discharge Strainers, Heavy-Oil Fuels
- **Lube Oil** Coolers (heat exchangers)
- Lube Oil Heaters (supply to machinery)
- Lube Oil Suction Strainers
- Lube Oil Discharge Strainers
- Lube Oil Centrifuges/Purifiers
- Lube Oil Purifier Heater
- Lube Oil Filters
- Stern Tube Bearings, Oil Lubricated
- Propulsion Shafting Thrust Bearings
- Propulsion Shaft Couplings
- **Propulsion Shaft Brakes**
- Stern Tube Seals
- Strut Seals
- Vacuum Equipment Associated with Steam (Condensing) Systems
- Vacuum Equipment Associated with Distilling Systems
- **Vacuum Equipment Associated with Pump Priming Systems**
- Vacuum Equipment Associated with Sewage Systems

Task S-41, Standard Practice for Identification and Description of HVAC Configurations:

- Standard Practice for Identification and Description of Design Configurations for Frequently Used Sheetmetal Ventilation Duct-work Shapes

Task S-42, Accelerated Publication of National Shipbuilding Standards:

- o Insulated W.T./O.T. Bulkhead & Deck Penetrations .
- o Steel Flanges for Non-Ferrous Piping**
- o Welded Sleeves for W.T./O.T. Bulkhead & Deck Penetrations
- o Commercial Steel Air Receivers
- o Commercial Steel Portable Water Tank
- o Butterfly Valve Envelope Dimensions
- o Mechanically Attached Fittings

Task S-43, Cableway Standards:

- o Standard for Cableway Components and Assemblies

Task S-44, Deck Covering Guide:

- o Standard Guide for Deck Covering

Task S-45A, Technical Review & Reformatting of the Following Navy Documents:

- o Paint Coating System, Steel Ship Tanks, Fuel & S.W. Ballast (Combine with MIL-C-4556) MIL-P-23236
- o Deck Covering in Electrical/Electronic Gear 805-2104467
- o Fibrous Double-Braided Polyester Rope MIL-R-24536
- o Acceptable Methods for Fitting Chocks 810-1385895
- o Water Trap for Diesel Engines 810-1385887
- o Terminals, Air, Diffusing, Circular MIL-T-11576
- o Rope, Nylon MIL-R-17343
- o Paint, Aluminum, Heat Resisting TT-P-28
- o Corrosion-Prevention Compound, Solvent Cutback, Cold Application MIL-C-16173
- o Paint Epoxy Polyamide, General Specification For MIL-P-2441
- o Cleats, Welded Horn Type NAVSEA Type Dwg. 805-2276338
- o Cleats NAVSEA Type Dwg. S1201-860099
- o Fibrous Plaited Polyester Rope MIL-R-14537
- o Rope, Fibrous, Double Braided, Nylon MIL-R-24050
- o Rope and Yarn, Plied, Synthetic Fiber MIL-R-24050
- o Polypropylene Cores, Strand Center and Substrands for Wire Rope MIL-P-24216A
- o Rope, Polyester, Film MIL-R-24335
- o Rope, Nylon, Plaited MIL-R-24337 .
- o Rope, Polyester MIL-R-30500
- o Rope, Fibrous, Plaited, Polyester, Polypropylene Dual Fiber MIL-R-43952

Task S-45B, Technical Review & Reformatting of the Following Navy Documents:

o Strainers, Steam (3 inches and below)	MIL-S-2953
o Expansion Joint, Pipe, Synthetic Rubber, Fire Retardant (Nav)	MIL-E-15330
o Strainers, Basket Type of SW Service, Assemblies & Details, 100 PSI Max.	S-4823-13855
o Shipboard Flush Valves	MIL-V-15020
o Check Valves for Low Pressure Air, Water and Oil Service	MIL-V-17547
o Spray Shields for Mechanical Joints	803-2145518
o Tubing, Round, Seamless Alloy Steel	MIL-T-15119
o Pipe Support Devices	MIL-P-15877
o Pipe Hangers and Supports	WW-H-171
o Connections, Flexible Shafting	S-4824-841650
o Connections, Flexible Shafting for Remote Valve Operation, Couplings and Quick Disconnect Assemblies	S-4824-841651
o Connections, Flexible Shafting for Remote Valve, Operations. Couplings and Quick Disconnect Assemblies	S-4824-841650
o Hangers, Pipe, for Surface Ships	804-1385781 (4 Dwgs.)
o Deck Plates for Operating Gear and Sounding and Filling Connections	S-4823-86022
o Gratings, Metal, Bar Type Flooring, Naval, Shipboard	MIL-G-18014B
o Gratings, Metal, Other than Bar Type (Shipboard Use)	MIL-G-.18015A

Task S-45C, Technical Review & Reformatting of the Following Navy Documents:

- o Light, Marker, Distress, and Night Replenishment MIL-L-573
- o Lock, Flush, Metal and Wood Door and Drawer, Naval Shipboard MIL-L-2898
- o Tank, Pressure, 600 psi Gage Working Pressure, Naval Shipboard Use MIL-T-15301
- o Reel, Fueling Hose, Manually Operated MIL-R-15917
- o Reels and Hose Guides, Manually Operated MIL-R-24414
- o Dehumidifier, Space, Mechanical Refrigeration MIL-D-19947

Task S-46, Participation on the International Standards Organization's Technical Committee (ISO TC-8) on Marine Standards:

- o The project essentially provides seed money.to the USA Technical Advisory Group (TAG) to participate on ISO TC-8 in the development of international marine standards.

Task S-48, Diesel Engine Standard

- o Standard for Main Propulsion Medium Speed Diesel Engine Performance and Minimum Scope of Assembly

Task S-49, Shaft Alignment Standard

- o Standard Practice for the Alignment of Propulsion Shafting Systems Using the Strain Gage Method

Task S-50, Marine Window Standards

- o Fixed Windows
- o Horizontal Hinged Windows
- o Heated Windows
- o Sliding Windows
- o Pendulum Window Wipers

Task S-51, Development of Portlights Standards

- o Portlights Standards

TABLE I I

PUBLISHED ASTM COMMITTEE F-25 Standards

F-670-80	Specification, Five Gallon (20 liter) and 10 Gallon (40 liter) Dispensing Tanks
F-681-82	Practice for Use of Branch Connections
F-682-82a	Specification for Wrought Carbon Steel Sleeve Type Pipe Couplings
F-683-84	Practice for Selection and Application of Thermal Insulation for Piping and Machinery
F-704-81	Practice for Selection of Bolting Lengths for Piping System Flanged Joints
F-707-82	Specifications for Modular Gage Boards
F-708-81	Practice for Design and Installation of Rigid Pipe Hangers
F-718-85	Shipbuilders and Marine Paints and Coatings Products/Procedures Data Sheet
F-721-81	Specification for Gage Piping Assemblies
F-722-82	Specification for Weld Joint Design for Shipboard Piping System
F-765-82	Specification for Wildcats, Ship Anchor Chain
F-782-82	Specification for Doors, Furniture, Marine
F-783-82	Specification for Staple, Handgrab, Handle, & Stirrup Rungs
F-821-83	Specification for Door and Frames, Steel, Interior, Marine
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